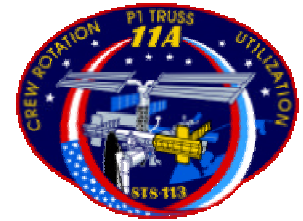


**Flight 11A/STS-113 Flight Readiness Review  
October 31, 2002**



# Agenda

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- Mission/Increment Overview
- On-Orbit Vehicle Status

Kim Ulrich  
Anthony Sang

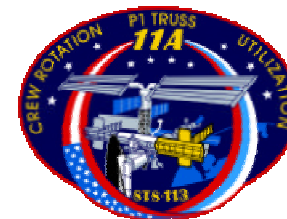
- Special Topic
  - Ammonia QD Loose Detent Button

Mark Santen

- 11A Flight Summary

Kim Ulrich





# Mission Summary

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**Mission Purpose:** Crew Rotation and P1 install

**Mission Duration:** 11+1+2

**Crew Size:** 7 on Orbiter

3 on ISS

**EVAs:** 39.0 man-hours (Orbiter crew EVAs)

**EVA 1:** 6:30

**EVA 2:** 6:30

**EVA 3:** 6:30

**Crew**

## Shuttle

- Orbiter CDR – Jim Wetherbee
- PLT – Paul Lockhart
- MS1 – Michael Lopez-Alegria (EV1)
- MS2 – John Herrington (EV2)

## Increment 6 - Arriving

- ISS CDR – Kenneth Bowersox
- FE1 – Nikolai Budarin
- FE2 – Don Pettit

**Rendezvous Altitude:** 211 nmi.

## Station Attitude:

**Initial Flight:** XPOP Inertial  
+XVV, Z Nadir

**Rendezvous:** +XVV, Z Nadir

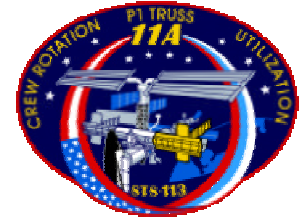
**Mated:** XVV, Z Nadir TEA

**Departure:** XVV, Z Nadir

## Increment 5 - Departing

- CDR – Valery Korzun
- FE1 – Peggy Whitson
- FE2 – Sergei Treschev





# Primary Mission Objectives

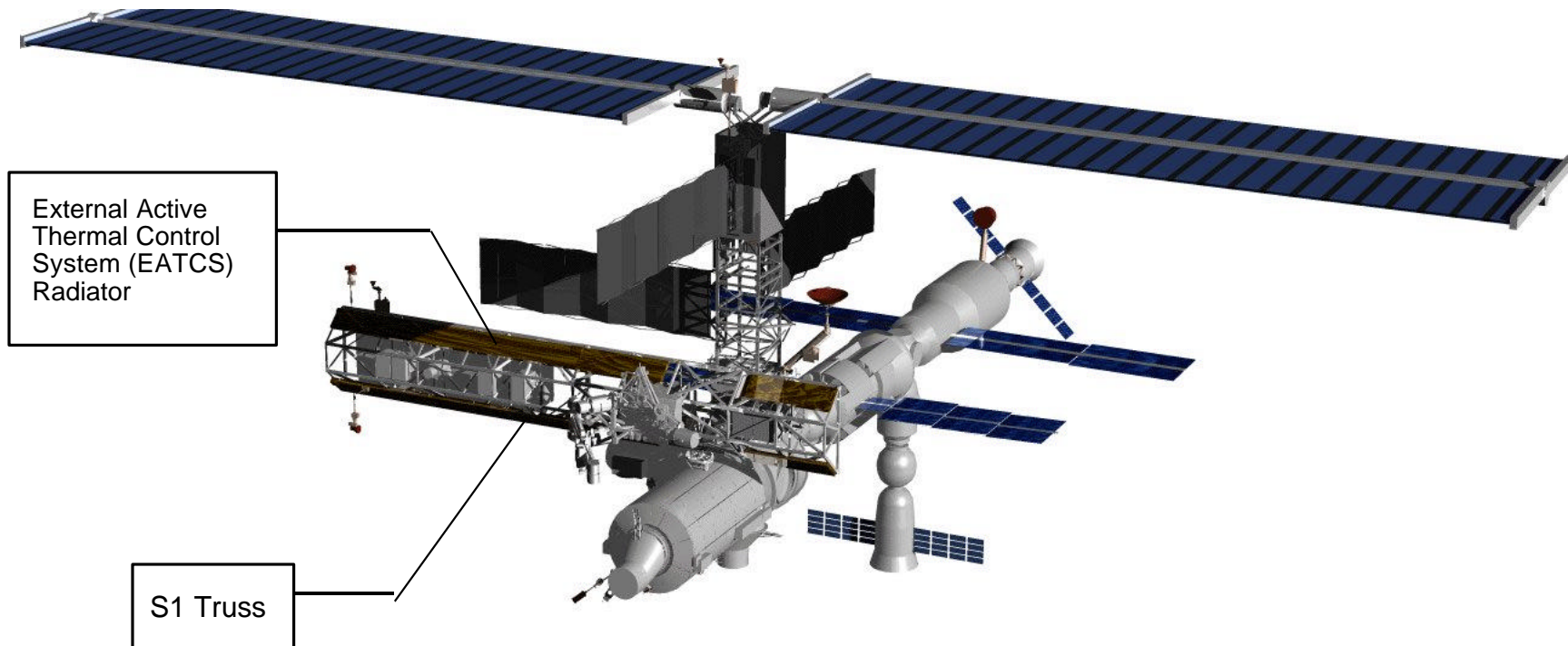
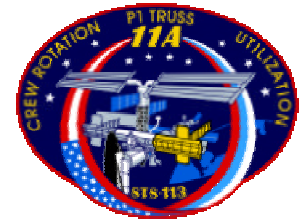
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- Rotate Expedition 5 crew with Expedition 6 crew
- Install P1 truss and complete tasks for P1 survival
- Complete 12 hours of crew handover and transfer critical equipment/supplies
- Prepare P1/ISS for the following missions
  - ULF1 (WETA installation/Dummy box return)
  - 12A (Clear MT path, Checkout MT WS 7, Reconfigure MBSU Jumpers, Checkout P1/P3 SSAS))
  - 12A.1 (43 SPDs, NH3/N2 line connection, DLA launch locks)
- Complete Additional handover/transfer
- Reboost ISS, Deploy MEPSI



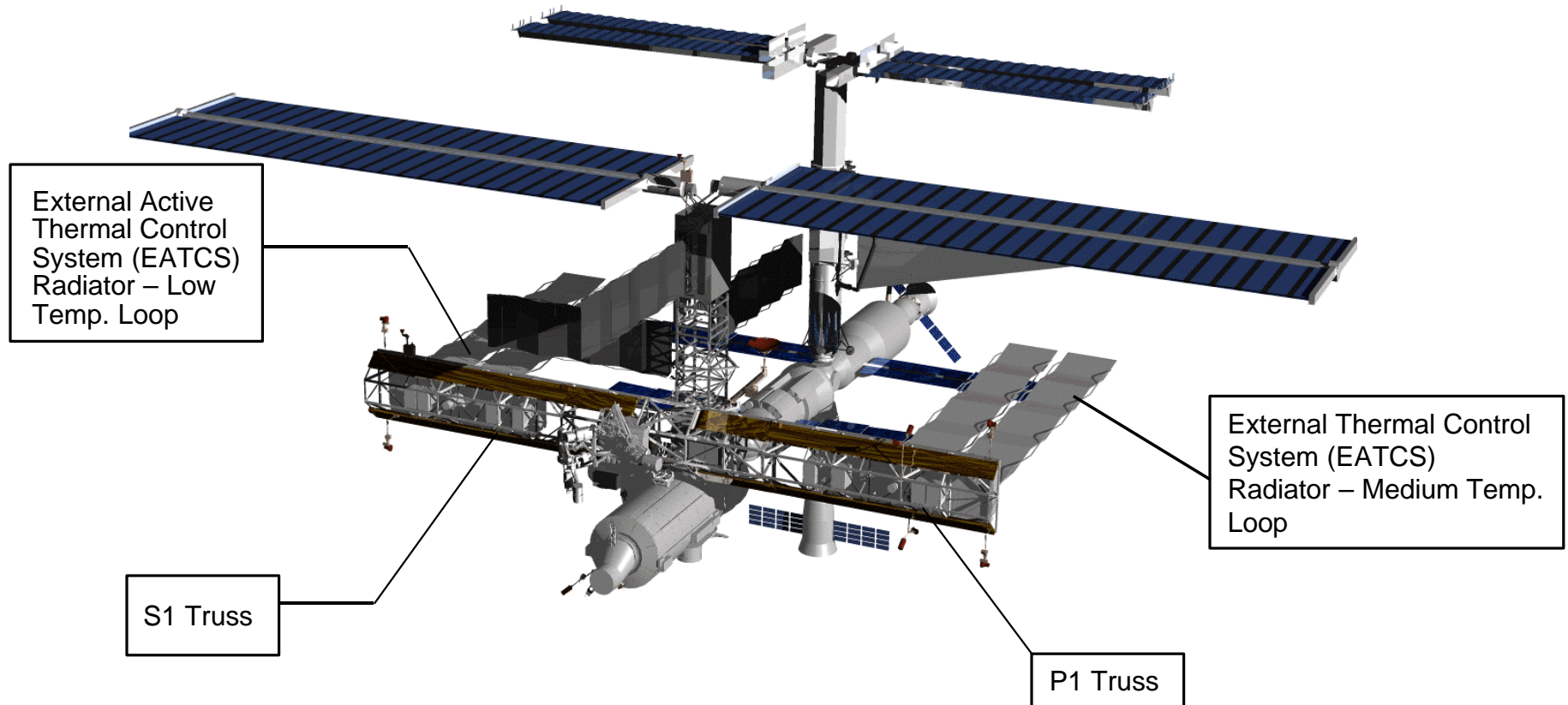
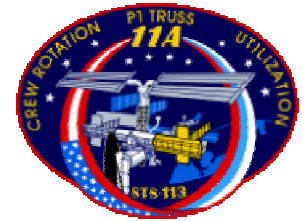


# 9A / STS-112 Stage Hardware Overview

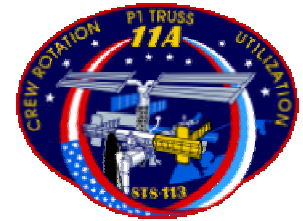




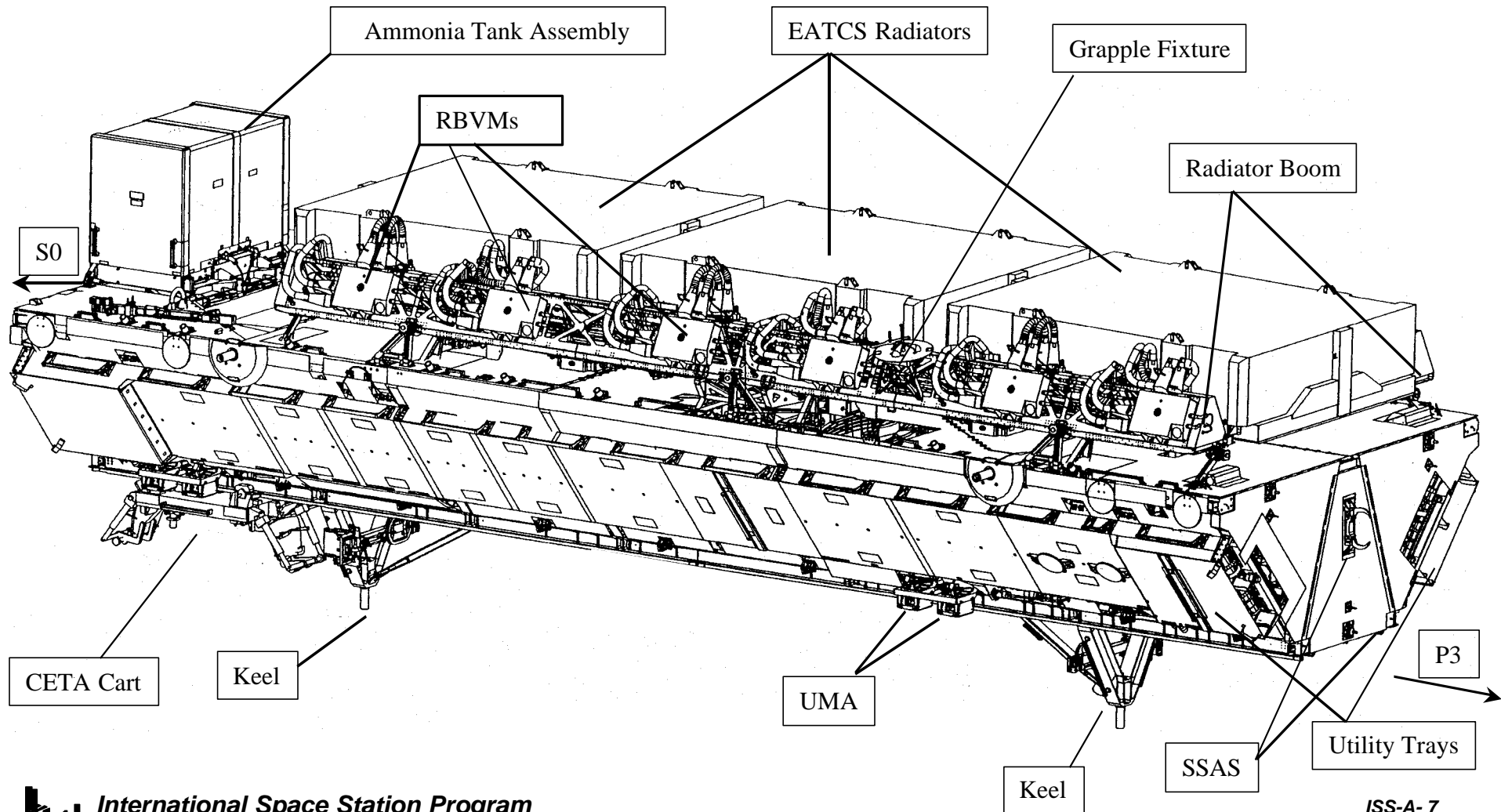
# 11A / STS-113 Stage Hardware Overview





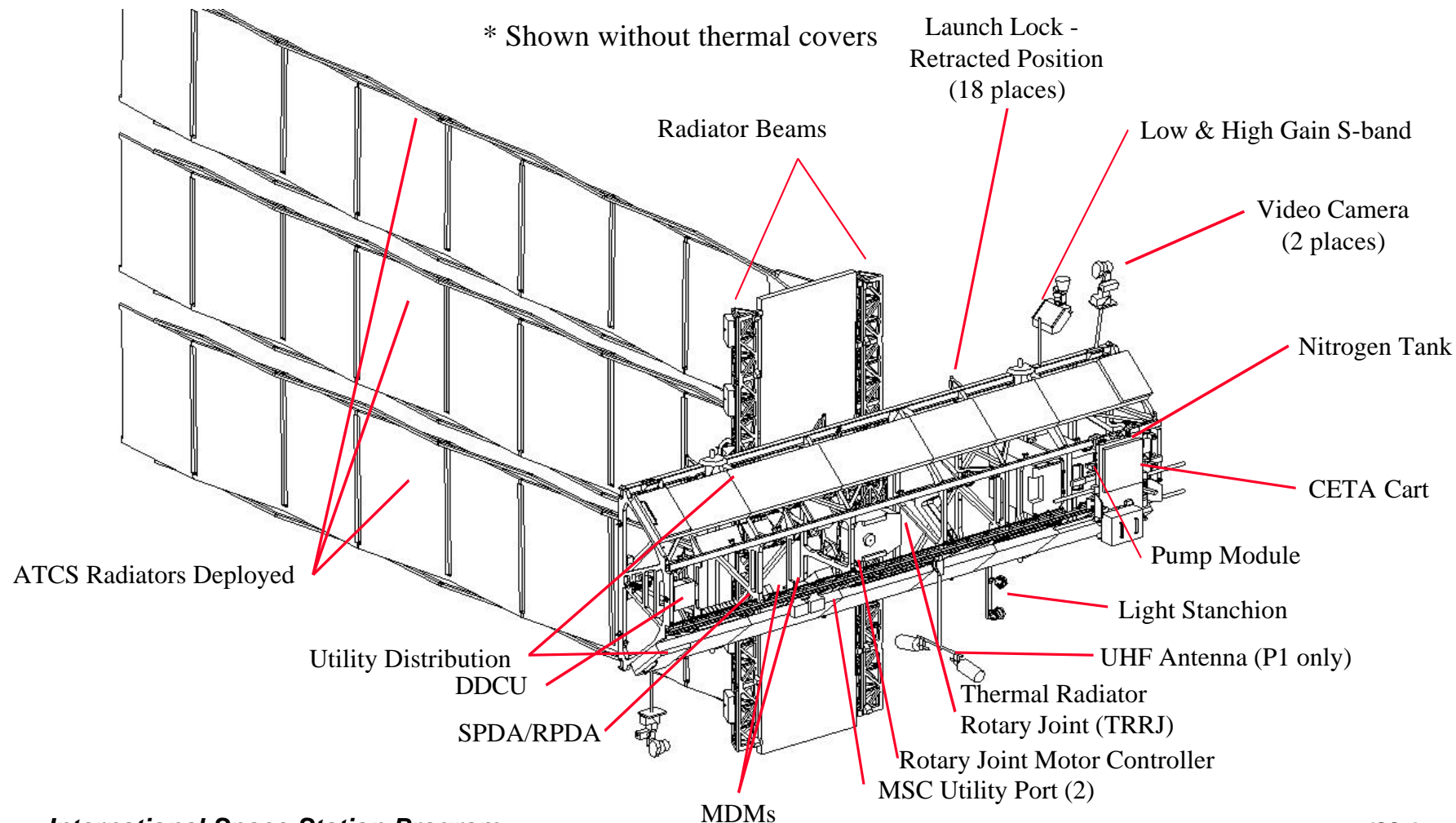


# P1 Cargo Element

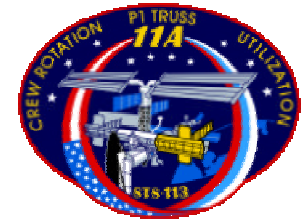




# 11A Stage Radiator Deploy







# Utilization Manifest Overview

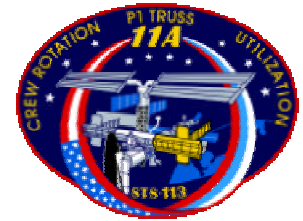
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## Ascent 6.0 MLE (Includes Packing Factor)

- **Powered Payload** 1 MLE **Crew time = Transfer**
  - ◆ Protein Crystal Growth – Single Thermal Enclosure System (PCG-STES)
- **Passive Stowage** 4.75 MLE **Crew time = Transfer**
  - ◆ Coarsening in Solid Liquid Mixture (CSLM) 1.4 MLE
  - ◆ Human Research Facility (HRF) Experiment Hardware 0.62 MLE
  - ◆ Sample Coil Assemblies 0.80 MLE
    - Investigating the Structure (In-SPACE)
  - ◆ Zeolite Crystal Growth (ZCG) Samples 1.2 MLE
    - and Support Hardware
  - ◆ Misc. Hardware

## Descent 6.60 MLE (Includes Packing Factor)

- **Powered Payload** 4 MLE **Crew time = Transfer**
  - ◆ PCG-STES 7 1 MLE
  - ◆ CGBA 1 MLE
  - ◆ PGBA 2 MLE
- **Passive Stowage** 2.0 MLE **Crew time = Transfer**
  - ◆ HRF 0.8 MLE
  - ◆ ZCG 1.2 MLE



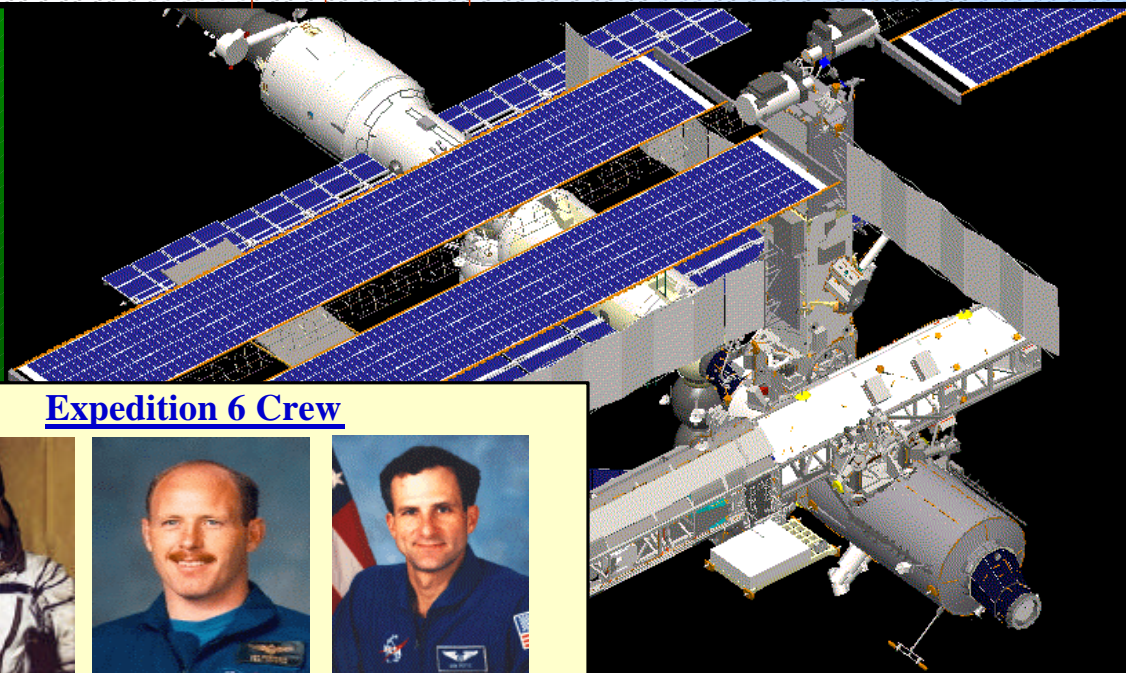
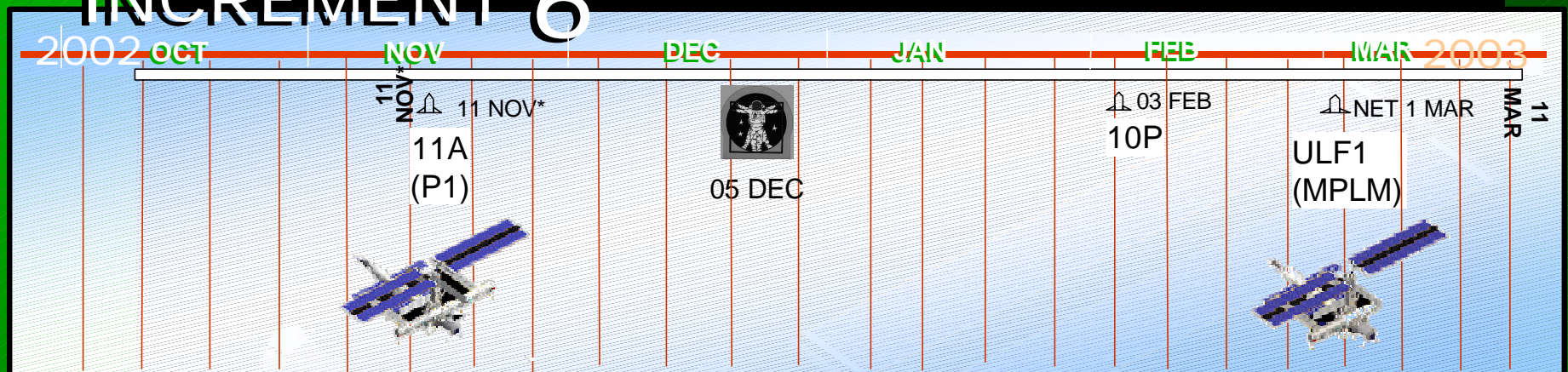
# 11A Consumables Summary

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- ISS N2 tanks status: **GREEN** through 11A (9A transferred – tanks almost full)
  - ✓ N2 transfer not required on 11A
- ISS O2 tanks status: **GREEN** through 11A (9A transferred – tanks almost full)
  - ✓ O2 transfer not required on 11A
  - ✓ Nominal O2 usage still maintains tanks with acceptable margin until transfer on 12A
  - ✓ Decision to transfer will be made real-time if consumables are available
- LiOH Supply exceeds requirement for nominal dual-bed CDRA operation
  - ✓ Assumes protection for EOM+3
  - ✓ Protects for single-bed CDRA operations and contingency cases
- Water transfer on 11A (7 CWCs) supports water demands through ULF1 arrival

***Consumables present no constraints to launch and on orbit operations***

# INCREMENT 6



## Expedition 6 Crew



N. Budarin



K. Bowersox  
Commander



D. Pettit

## Increment 6

From 11A Launch

November 11, 2002 (\*U/R)

To ULF1 Undock

NET March 11, 2003

Duration – 120 Days

On-board ISS – 118 Days



Denotes EVA



# Increment 6: Stage 11A Overview

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## Stage Data

### **11A Undock Date:**

November 20, 2002 (\*U/R)

### **ULF1 Unock Date:**

NET March 11, 2003

### **Duration:**

120 days

## Crew

### **Commander**

Ken Bowersox

### **Flight Engineer 1**

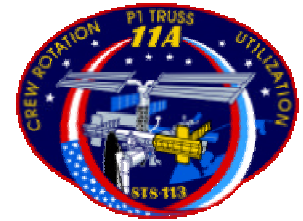
Nikolai Budarin

### **Flight Engineer 2**

Don Pettit

## Stage Objectives

- Stow 11A cargo
- Perform U.S. and Russian Utilization
- Perform USOS EVA including P1 central radiator deploy, UHF antenna deploy, and CETA cart outfitting
  - Followed by IVA checkout of P1 TRRJ and UHF antenna
- Perform USOS software upgrades required for 12A
- Perform high priority SSRMS OCRs
- Prepare ISS and crew for Flight ULF1
  - SSRMS Checkout
  - CBCS Installation and Checkout
  - EVA preparation (airlock and tools)
  - External TV Camera Group (ETVCG) & Luminaire assembly
  - Prepack for cargo return and crew rotation



# Payload Status

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- **Active US Science Facilities**

- EXPRESS #1, EXPRESS #2, EXPRESS #4, Human Research Facility (HRF) Rack (as scheduled), Micro-gravity Science Glovebox (MSG) Rack (as scheduled)

- **Ongoing Increment 5 US Payload Investigations**

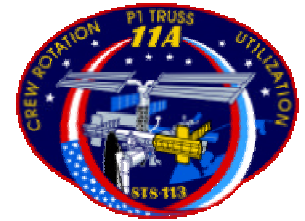
- NASA Code M:
  - Crew Earth Observation (CEO) and Material International Space Station Experiment (MISSE) - External
- Human Life Sciences (HLS):
  - Interactions, EVA Radiation Monitor (EVARM), Pulmonary Function in Flight (PuFF), Renal Stone
- Micro-gravity Research Program Office (MRPO):
  - Space Acceleration Measurement System (SAMS), Microgravity Acceleration Measurement System (MAMS), Protein Crystal Growth (PCG)-STES, Pore Formation and Mobility Investigation (PFMI), and MSG Belgian Taxi Flight
- Space Product Development (SPD):
  - Plant Generic Bioprocessing Apparatus (PGBA)/Commercial Generic Bioprocessing Apparatus (CGBA)

- **Increment 5 Payloads Affecting 11A**

- Return hardware and samples include: PCG-STES, PGBA, CGBA, Zeolite Crystal Growth (ZCG), HRF return, Belgian Taxi Flight Return







# Payload Status – Cont'd

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## •Increment 6 New Investigations

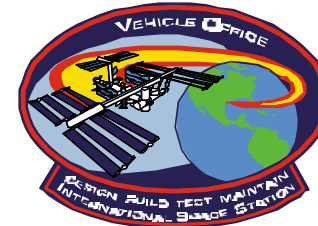
- HLS: Foot/Ground Reaction Forces During Space Flight (FOOT)
- MRPO: InSPACE, CSLM, PCG-STES #10 (new samples delivered on 11A)
- SPD: Zeolite Crystal Growth (new samples delivered on 11A)

## •Increment 6 Continuing Investigations

- Code M: CEO, EARTHKAM, MISSE
- HLS: Renal Stone, PuFF
- MRPO: MAMS, SAMS, PFMI



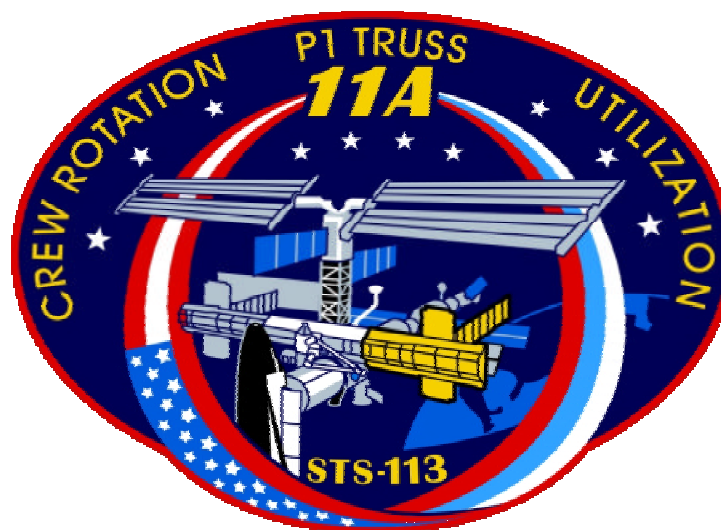




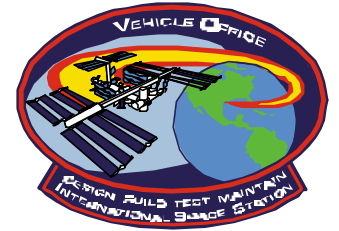
# Vehicle Office

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**STS-113 / 11A**



**Flight Readiness Review  
October 31, 2002**



## **AGENDA**

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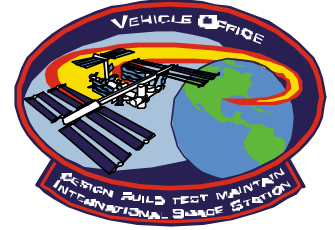
# **On-Orbit Vehicle Readiness**

**A. Sang**



# AGENDA

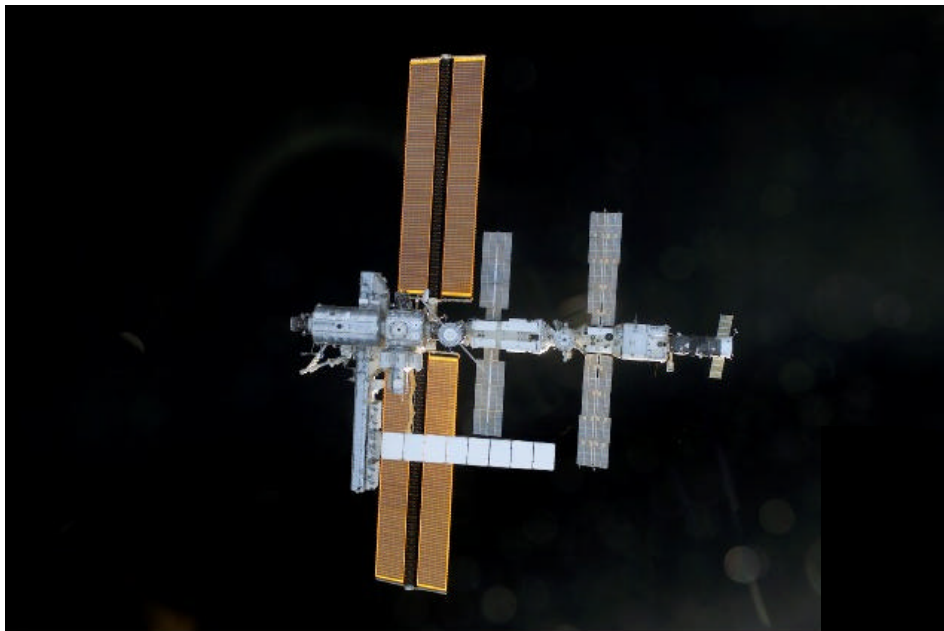
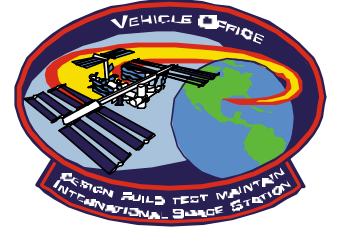
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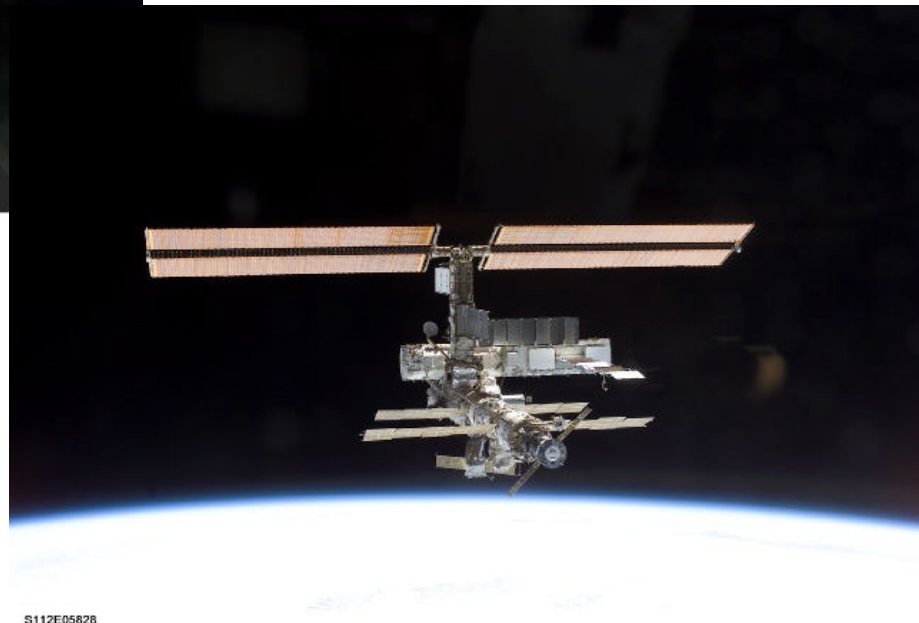
- **On-Orbit Vehicle Readiness**
  - **Flight 9A Configuration**
  - **Hardware Status**
    - **9A Status**
      - **Integrated GN&C Status**
      - **Treadmill Vibration Isolation System (TVIS)**
      - **Interim Resistive Exercise Device (IRED)**
      - **Trailing Umbilical System (TUS) Interface Umbilical System (IUA)**
      - **Carbon Dioxide Removal Assembly (CDRA)**
      - **Airlock Common Cabin Air Assembly (CCAA) Water Separator**
  - **Backup**
    - **On-Orbit Summary**



# Flight 9A Configuration



S112E05845

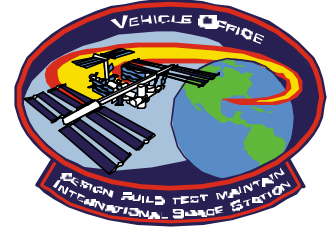


S112E05828

ISS-B--4



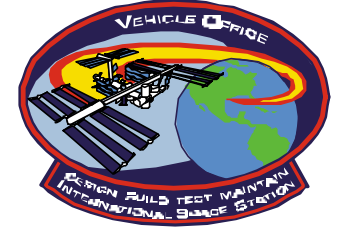
# Hardware Status (New)



Issues	New Since 9A FRR	Impact to 11A Docked Operations	Topic to be Presented
GIVUS Offline	Yes	No	Yes
SIGI 1 (GPS) Data Causes GNC MDM Fail to Diagnostic Mode	Yes	No	Yes
RGA-1 Depressurization	Yes	No	No
IREC Canister Anomaly	Yes	Yes	Yes
ACBM Contamination	Yes	No	No
MCA Purge Time Override Failed Error	Yes	No	No
SM Vosdukh Intermittent Failure	Yes	No	No

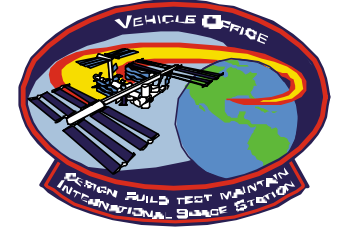


# Hardware Status (Ongoing)



Issues	New Since 9A FRR	Impact to 11A Docked Operations	Topic to be Presented
CMG #1 Failure	No	No	No
Ammonia QD Lock-up/Spool Positioning Devices (SPD)	No	Yes	No
PGT Out of Cal Impacts	No	No	No
BGA Shoulder Bolt	No	No	No
A/L CCAA Water Separator	No	No	Yes
ITCS Coolant Quality	No	No	No
USOS Battery Pressures	No	No	No
BGA High Motor Current	No	No	No
RPCMs	No	No	No
SSRMS Camera Address Assignment	No	No	No
SM Kurs Intermittent Failure	No	No	No





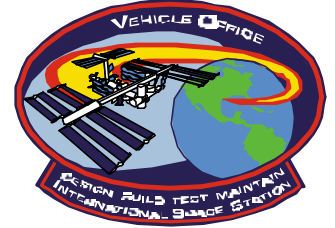
# Integrated GN&C Status

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- The primary US GN&C MDM transitioned to diagnostic on Sunday September 22<sup>nd</sup> and again on Monday September 23<sup>rd</sup>
  - Fault tree analysis indicating most likely cause of both events was isolated to an illegal output value (NaN) in data provided by one of the GPS Receivers, specifically the attitude code.
  - The GPS receivers were powered off to allow the GN&C team to perform troubleshooting.
- The Russian GIVUS went offline on Friday October 25<sup>th</sup> reducing the overall Station navigation system redundancy.
  - GPS 1 powered on in standby mode to allow use of US attitude string as primary source.
  - GIVUS was recovered later on Friday October 25<sup>th</sup>.
  - Identified need to accelerate the plan to recover full US navigation system capabilities.
- Plan to patch the GN&C flight software presented to ASCB on Friday October 25<sup>th</sup>.
  - Develop two patches that will allow the software to handle any NaNs as standard exceptions.
- GPS 1 and GPS 2 brought up to provide state determination redundancy on October 28<sup>th</sup>
  - Attitude code inhibited to prevent NaNs from being generated.
- 24 hour patch process initiated on Monday October 28<sup>th</sup>
  - Patches delivered to the MBF on October 29<sup>th</sup>
  - Team review of patch Integrated Flight Load (IFL) scheduled for 15:00 CST October 29<sup>th</sup>
  - MOD plan to uplink on November 1<sup>st</sup>

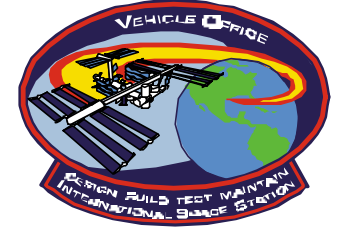


## 9A Status



- **TVIS**
  - On STS-112/9A, the TVIS chassis R&R and activation/checkout was successful.
    - Inc 5 crew has go for operations with no loading restrictions on SLDs, but speed restrictions for two crew in place.
    - Inc 6 crew restriction pending 11A stage assessment.
  - During R&R crew reported that the 3 of 4 gyro cables were damaged with one severely damaged.
    - Temporary maintenance procedure implemented.
    - Soyuz 5 to deliver one set of new gyro cables.
      - Potential for STS113/11A to bring additional set.
      - Repair to be perform during 11A Stage.
- **IREC Canister**
  - Pre-STS-112/9A decision to not return any cans on 9A.
    - 100K cycle canisters to be used first until failure or return.
    - New canisters maintenance restored canister to reduced capability
  - Return 100K canisters on 11A.
  - IFM to be performed on suspect canisters during 11A stage.
- **TUS IUA Status**
  - Safing bolts removed successfully, therefore R&R was not required.
  - Full functionality restored. No impact to 11A operations.

**NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS**



## 9A Status

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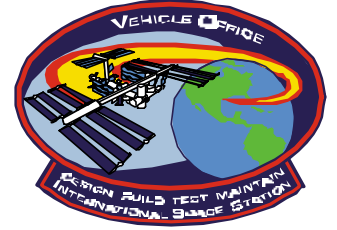
- **Carbon Dioxide Removal Assembly (CDRA) Operations**
  - CDRA dual bed mode operation was nominal.
  - SDTO performed on 9A
    - Configuration: Vozdukh off, no LiOH changeout on Orbiter, and CDRA operating in dual bed mode.
    - ppCO<sub>2</sub> maintained under 6 mm Hg for approximately 34 hours.
  - CDRA ready to support 11A.
- **Airlock CCAA Water Separator R&R 9A Results: R&R was completed successfully.**
  - 9A Docked phase: LTL flow reduced to 100 lbm/hour.
  - 9A Stage phase: Housekeeping mode, i.e., no LTL flow and fan off.
  - Hamilton Sunstrand investigation has begun.
    - Preliminary indication show that MetOx restrictions can be lifted.
      - Results show that the water separator was clogged due to increased number of wet/dry cycles.
  - 11A has only no constraints to operations.

**NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS**

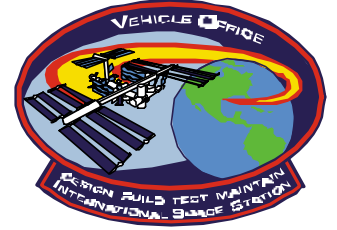


## Conclusion

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- ISS MER has reviewed all of the open issues (including 9A issues) and concludes that the on-orbit vehicle has no constraints to STS-113/11A launch or operations.



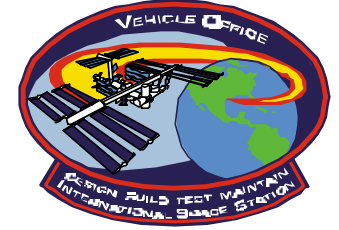
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# **Loose NH3 QD Detent Button**

**M. Santen**

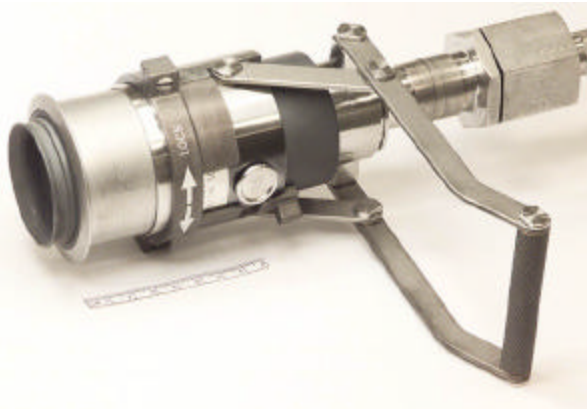
**M. Santen / Boeing Hou TCS**

**T. Bond / NASA JSC TCS**



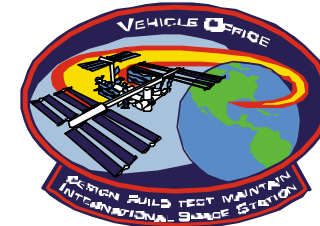
# Issue

- EVA crewman reported during 9A that the S1-1 Radiator 1" Female labeled "F1" (S/N 1070) had a detent button that was partially unscrewed
  - Screw threads visible under the button head
  - It was clearly spaced radially farther than expected
  - Crewman retightened button cap by hand - taking reportedly six turns
    - Approximately 10 turns to fully remove the detent button



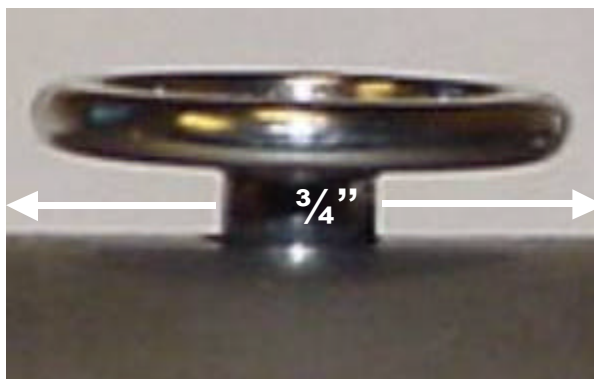
*Note: The QD shown does not have the detent locking collar installed like the one on-orbit.*





## QD Detent Button & Button Cap

Fully seated button cap



Button cap



Partially unseated button cap



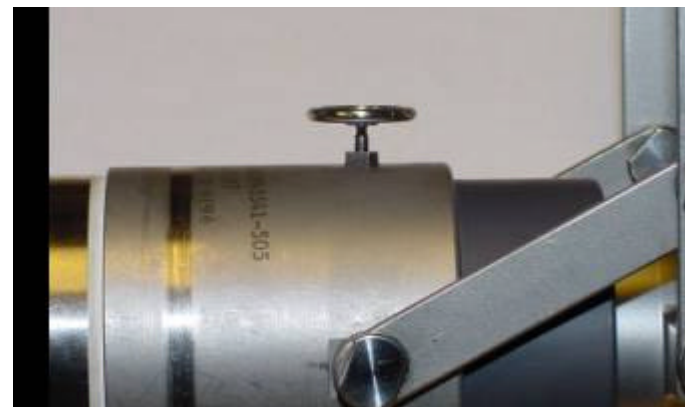
Fully seated button cap



Detent button



Partially unseated button cap



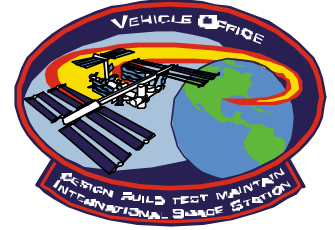
***Note: The QDs shown do not have the detent locking collar installed like on-orbit.***  
**ISS-B--13**





# Detent Button / Cap Assembly Requirements Assessment

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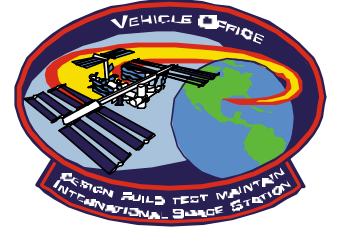
- Detent button was intended to be held in place with both thread-locking compound and torque
  - Original build paper used for S/N 1070 (and most other P1 QDs) included steps to install thread-locking compound and torque to 20 in/lbs prior to ATP
    - Tech buy with QC verify (not witness)
  - Check of flight-like 1" and 3/4" QDs at Parker showed that thread-locking compound was present and the button did not freely come loose without resistance
    - 5-10 in/lbs breaking and similar running torques
    - This is sufficient to prevent loosening during launch
- Qual QD vibration tests at high levels successfully conducted without any detent button problems
  - ATP does not include vibration

**Engineering intent was to require thread-lock and torque**



## Two Basic Issues Revealed From Investigation

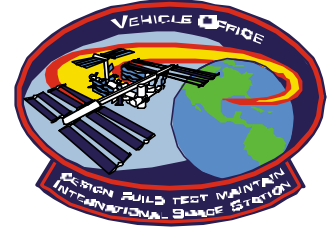
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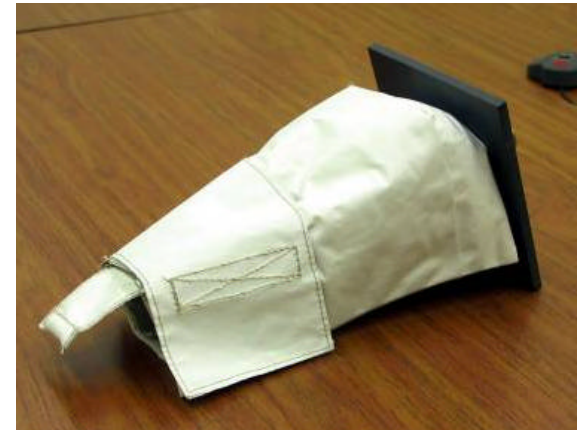
- Build paper review and engineering analysis has revealed that there are two basic issues to address:
- QDs with rework may not have thread-lock
  - QDs which failed their original ATP and were reworked as part of the normal Parker build process may have been reassembled without proper thread-locking compound on the detent button cap
- Some 1.5 inch QDs may not have thread-lock
  - A portion of the 1.5 inch QDs were assembled using a discrepant version of processing paper that did not call for the use of thread-locking compound
  - This potential exists regardless of whether or not any rework was performed



## QDs with rework may not have thread-lock



- Belief is that S/N 1070 (problem QD from 9A) lacked thread-locking compound
  - 1070 was reworked due to an ATP failure, but traceability of rework process was lacking when this QD was built (1998)
    - Quality process flaw discovered and corrected in 2000
  - 1070 came from a build lot of 20 QDs – 2 others on P1 but neither was reworked
- Team believes QD rework may = no thread-lock
- Other QDs on P1 with rework in their history:
  - Five suspect QDs - Four  $\frac{3}{4}$ " QDs on RBVM and Rads, and one  $\frac{1}{4}$ " QD on DDCU coldplate
  - All of these QDs are contained in MLI booties that can offer some degree of containment of a loose detent button
- None of the uncovered P1 QDs experienced any form of rework

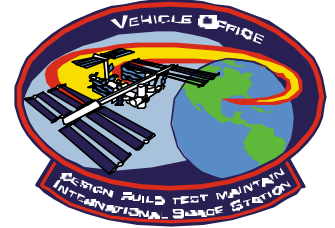


**All reworked QDs on P1 are currently inside booties**





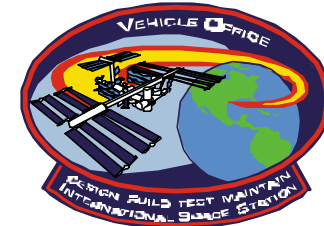
## Some 1.5 inch QDs may not have thread-lock



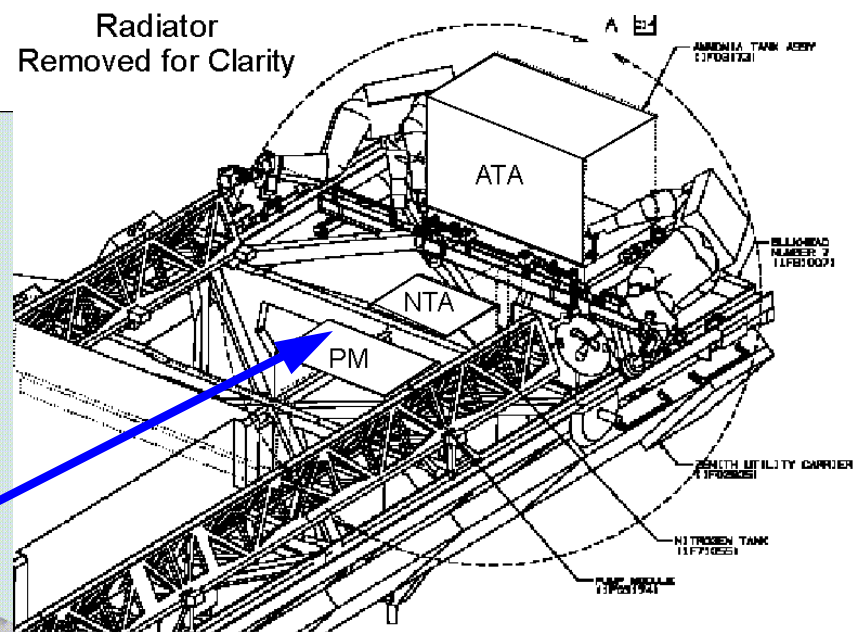
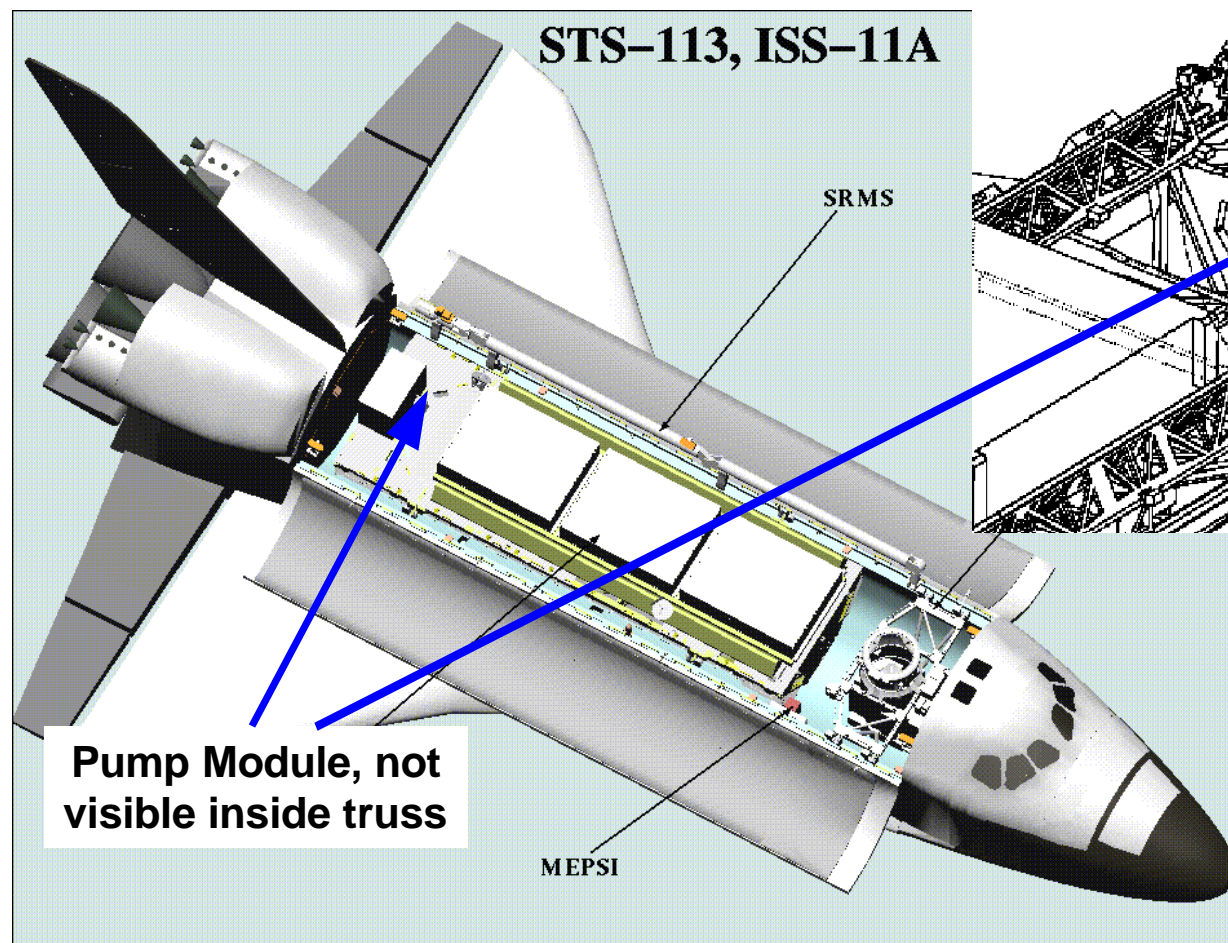
- Further review revealed that two versions of build op sheets on 1.5" size co-existed during the majority of flight QD builds
  - One version did not reference installing thread-locking compound at all
- Isolated to group of 14 QDs on S0/S1/P1 (PMA and Seg-Seg jumpers)
  - TRRJ and FHRC are not affected
- Of those 14, three on P1 PMA do not have booties
  - Mitigating Data
    - 8 x 1.5" Seg to Seg Jumper QDs launched on S0 had same omission in build paper, four of which were operated on 9A. No button problems encountered.
    - 3 x 1.5" S1 PMA QDs likely have same omission in build paper and were operated on 9A. No button problems encountered.
    - 2 x 1.5" Non-Nedox Qual QDs had same omission in build paper and passed delta qual random vibration testing to much higher levels than are seen in orbiter. No button problems encountered.
    - 3 x 1.5" Identical TTA PM QDs had same omission in build paper but were found to actually contain thread-locking compound and sufficient running torque

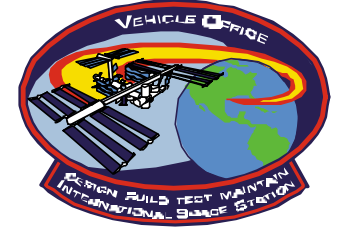
**Low likelihood that 1.5" QD detent buttons will come loose**





## Location of PM in Payload Bay





# Rationale For Flight

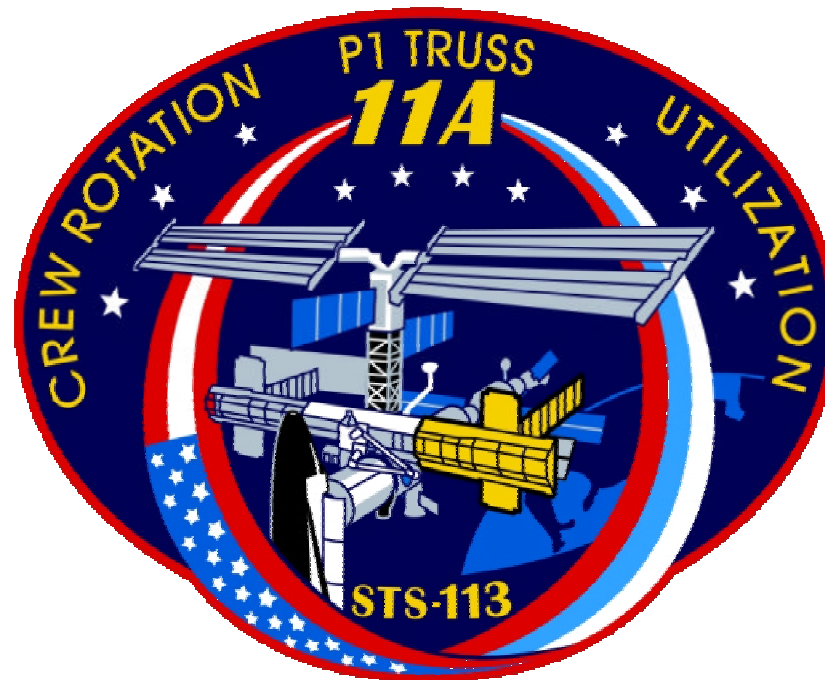
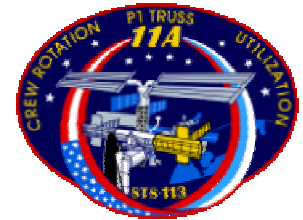
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- **Close this concern for 11A as an acceptable risk**
  - **Even with one instance of a partially unscrewed button on 9A, ground and flight experience shows no other detent button caps have unscrewed and none fully detached**
    - **Ground test showed sufficient breakaway and running torque with thread-lock**
    - **Multiple processing opportunities to notice loose detent buttons**
  - **Damage to Orbiter or Station hardware is unlikely if the detent button cap fully unscrews**
    - **Button mass is 0.0088 lb (0.14 oz) vs 0.25 lb (28:1) limit imposed by SSP 30558 for non-hazardous released parts (ISS) or fracture critical hazard controls by NASA-STD-5003 (Shuttle)**
    - **Uncovered QDs are located inside the P1 truss which is covered by exterior MLI**
    - **Low likelihood that loose detent button could reach and jam payload bay mechanisms**
    - **All suspect reworked QDs have booties/MLI covers**
    - **Low likelihood that 1.5” QD detent buttons will come loose**
- **Modify flight procedures to check for tight button cap as first step when EVA crewman visits a QD worksite**
  - **Any QD that cannot be operated on 11A due to missing detent button can be revisited on a later flight**



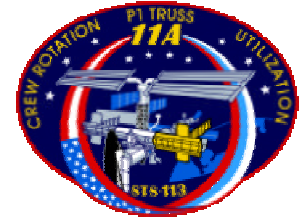
# ISS Program Summary

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**Flight 11A/STS-113 Flight Readiness Review**

**October 31, 2002**



# ISS 11A Program Reviews

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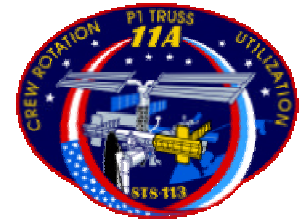
## Launch Package Assessment (LPA) – September 10, 2002

- Addressed the launch package readiness for integration into the Orbiter.
- Successfully completed and authorized to proceed with payload processing.

## Stage Operations Readiness Review – October 17, 2002

- Addressed CoFR requirements for cargo elements, middeck stowed hardware, launch package, personnel, facilities, operations and their readiness to proceed to launch 11A on 11/11/02.
- Authorized to proceed to launch 11A.
- No open waivers or exceptions.
- All flight 11A applicable actions are closed.



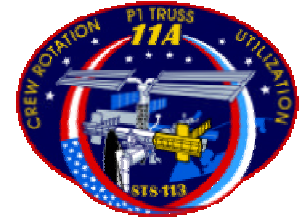


# Open Paper

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- Manifest hardware R-notes (approximately 22 items) mostly re-flown hardware – ECD 11/06/02
- All open paper is closed except for pending standard forward work
  - ◆ Late load payloads





# ISS Program Summary

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- **MER has verified all ISS Launch Commit Criteria are GO**
- **Flight objectives and priorities are identified**
- **Flight manifest and processing schedule supports launch date**
- **All hardware and software certifications are complete or will be complete prior to launch – standard forward work**
- **Mission Integration Documentation - Complete**
  - ◆ IDRD, MIP, ICDs, JTWG endorsements and CAD models
- **Personnel and facilities are ready to support the mission**
- **None of the standard forward work represents a constraint to the flight 11A launch**

**The ISS Program is ready to proceed with the launch of ISS 11A/STS-113**



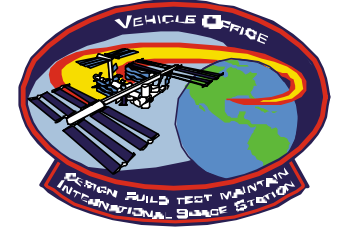


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# BACK-UP

ISS-B-B/U-1





# Current On-Orbit Status

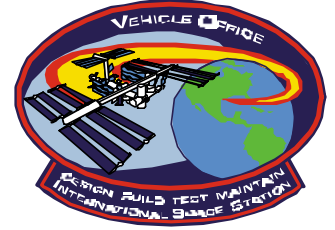
- **C&DH**
  - All Station MDMs operational
    - Node - N1-2 primary, N1-1 secondary
    - Lab
      - C&C 1 standby, C&C 2 backup, C&C 3 primary
      - INT systems 1 off, INT systems 2 operating
      - LA MDMs: LA-1, LA-2, & LA-3 - operating
      - Power Management Controller Unit (PMCU) 1 off, PMCU 2 operating
      - GNC 1 backup, GNC 2 primary
      - Payload MDMs: PL 1 off, PL 2 primary
    - Airlock MDM - operating
    - Photovoltaic Control Unit (PVCU) MDM - 2B backup, 4B primary
    - EXT 1 – off, EXT 2 – operating
    - S0 MDM: S0-1- operating; S0-2 - operating
    - S1 MDM: S1-1, S1-2, and STR operating
    - FGB - 1 operating, FGB - 2 off
    - SM - Loaded with version 5.0 software
      - SMCCs – all in redundant set, SMCC-3 primary
      - SMTCS – all in redundant set

NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS



## Current On-Orbit Status (continued)

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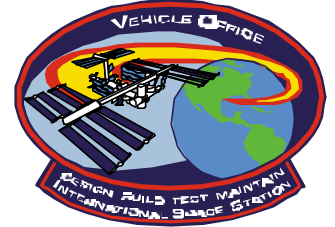
- **C&T**
  - S-band high/low data rate operating nominally
    - *Fully redundant*
  - Ku band operating nominally
  - MCOR operational on 2 channels.
  - *HCOR on board. Installation schedule post 11A.*
  - *External TV Camera Group (ETVCG) on Lab and S1 are operational.*
  - Audio system
    - Internal Audio Controller: IAC-2 active, IAC-1 off
      - Have occasional P-bits on audio equipment. No impact.
  - SM Regul System - 2 of 3 strings operational
  - SM Kurs set #2 has intermittent failures - no impact

NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS



# Current On-Orbit Status (continued)

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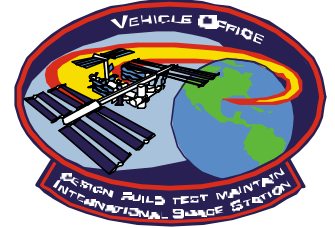


- **ECLS**
  - Lab ECLS systems operating as required
    - CDRA operational in dual bed mode.
    - MCA operational.
  - Node smoke detector #2 operational, but off due to dirty indication –
    - Still awaiting on-orbit troubleshooting
    - Cleaning procedure in work.
  - Airlock CCAA water separator R&R'd but 9A stage restrictions in place.
    - No constraint for 11A EVA operations.
  - Vacuum System Pirani gauges do not provide output below 7.5 to 9 millitorr.
    - 11A stage payload requires operational vacuum system.
    - ASCB to approve PPLs to adjust calibration curves and limits
  - SM Vozdukh operating on 2 of 3 CO2 removal beds
    - CO2 removal capability nominal
    - Vozdukh has experience intermittent failures.
  - SM Air conditioners (SKV) #1 operational, #2 degraded (latent heat removal)
  - SM Elektron: Operational.
  - SM rapid depress response nominal.

**NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS**



## Current On-Orbit Status (continued)



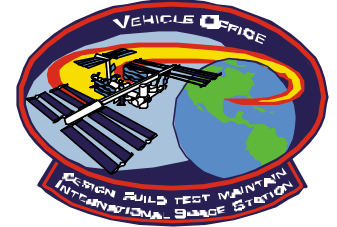
- **EPS**
  - **FGB EPS working nominally**
    - 5 of 6 batteries on-line
  - **SM EPS working nominally**
    - All 8 batteries on-line
  - **P6 power channels 2B and 4B operating nominally**
    - 2B and 4B rotated as required for power
    - Dual angle mode and XPOP flown when possible
  - **S1 – 12 RPCMs operational**
  - **RPCMs**
    - RPCMs LAD22B-A, LAFWD-1B-A, LAFWD-1B-C, and LAD62B-A have bit flips on SRAM and cannot be refreshed
      - No short term impact
      - Spares available, if required
    - Overall R&R plan being implemented to return suspect RPCMs to the ground
    - P6 Battery 4B21 vs 4B22 Average Pressure Delta: ~ 7232 mmHg (~ 143 PSI)

**NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS**



## Current On-Orbit Status (concluded)

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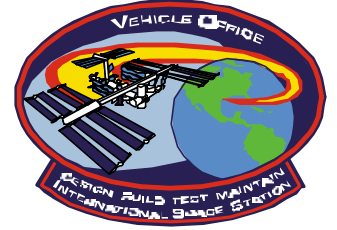
- EV&CS/GFE hardware
  - VOA (air sample analyzer) - sporadically operational
    - 3-4 month system validation process in work
    - *Hard drive with new software load delivered on 9A*
  - TOCA (water sample analyzer) – degraded
  - TEPC (radiation monitor) – *nominal*
  - Defibrillator - Operational
  - IRED – Operational. 100K canisters will be swapped on 11A.
  - CEVIS – Operational.
  - TVIS – chassis R&R completed, nominal operations
    - Gyro cables
  - IV-CPDS - experiences occasional downlink of data problems
  - EV-CPDS – Operating
  - Water Maintenance Kit (WMK) - kits useable

NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS



## Current On-Orbit Status (continued)

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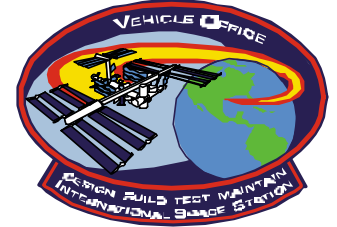
- **EVR**
  - SSRMS fully operational on both strings.
  - MT nominal for planned operations.
  - RWS operational
- **GN&C**
  - CMG #1 failed
  - All remaining CMGs have experienced occasional loss of comm
  - GPS system deactivated due to NaN data sending GNC MDM to diagnostic mode.
    - Workaround in place.
    - Operating in post-5A/pre-8A configuration.
      - Russian attitude data is prime.
      - US attitude determination backup.
- **Propulsion systems**
  - Nominal.

**NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS**



## Current On-Orbit Status (continued)

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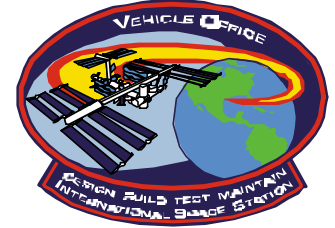
- **S&M**
  - 2B and 4B BGA showing high currents sporadically
    - 2B and 4B rotated as required for power
    - Dual angle mode and XPOP flown when possible
    - Low b X-POP being pursued to limit BGA rotations, when possible.
  - Impact mark on SM window #7
  - 3 of 4 Beta Gimbal Assembly (BGA) latching mechanisms locked on starboard 4 Bar assembly
    - Latched port 4 Bar assembly on 5A.1
    - Strength analysis shows 3 of 4 acceptable for life.
  - S1 truss segment integrated with S0
  - CETA cart capability

**NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS**





# Current On-Orbit Status (continued)



- **TCS**
  - **Early external active thermal control system (EEATCS) operating within specs**
    - **Starboard radiator has one loop plumbed incorrectly**
      - Heat rejection capability impacted - still meets current heat rejection needs
  - **External Active Thermal Control System (EATCS): All necessary umbilicals connected and integrity verified and being trended -- Loop A is filled with Nitrogen pad**
    - S0-to-S1 Fluid jumpers installed
    - ATA-to-PM umbilicals connected
    - NTA-to-ATA umbilicals connected
    - Loop A Pressures steady (trending will be ongoing until 12A.1)
  - **SPDs installed on 33 QDs (RBVMs, S1-to-S0 jumpers, ATA-to-PM, PM, and TRRJ Stinger); 4 of which are on wet QDs.**
  - **ORU Checkouts for PM, ATA, NTA and RBVMs successful**
  - **TRRJ Checkout completed**
    - Rotated to +113.7 and -114.9 degrees
  - **S1-2 Radiator deployed**
- **ITCS operating nominally**
  - **ITCS fine filter R&R plan established.**
  - **Comprehensive ITCS fluid forward plan still in work**

**NO CONSTRAINTS TO LAUNCH AND ON-ORBIT OPERATIONS**

**ISS-B-B/U-9**